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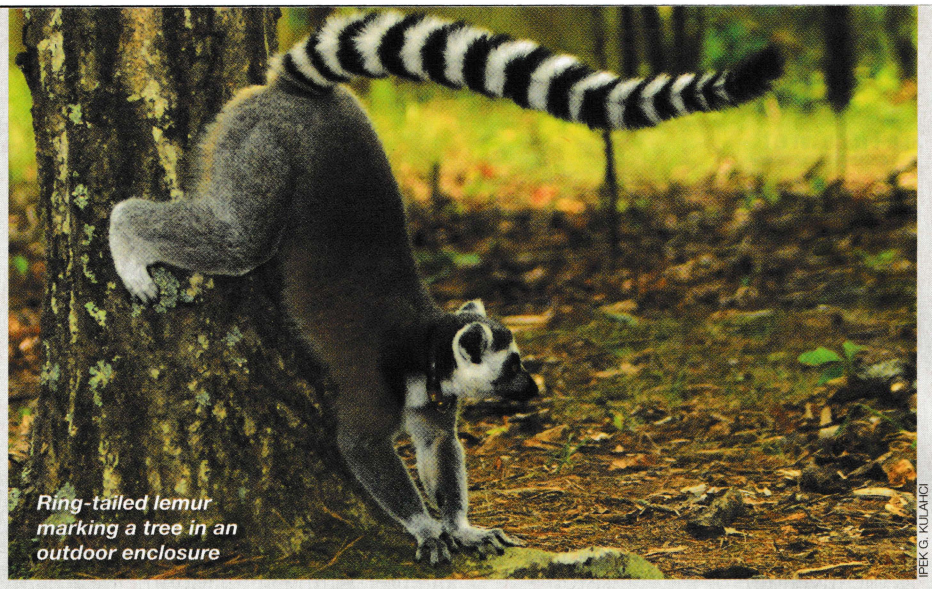
Smellophone Call



Ring-tailed lemur marking a tree in an outdoor enclosure

IPEK G. KULAHCI

Ring-tailed lemurs, *Lemur catta,* are highly social primates roughly the size of house cats. They have an intricate communication system that involves a suite of vocalizations—ranging from long-distance calls with unique identifying information to close-proximity calls such as purring—to track one another in Madagascar's forests. In addition, lemurs produce complex personal scents from glands near their genitals and, in males, also from glands on the top of their arms. Varying by season, those scents can convey anything from fertility to territorial boundaries. The two forms of communication signal identity, elicit recognition, and maintain group cohesion. Since some animals, including crows and horses, can recognize individuals by matching their appearance with vocalizations, scientists wondered whether, similarly, lemurs might use scent with sound to identify individuals in their groups.

Ipek G. Kulahci, a PhD student at Princeton University, and three colleagues tested two groups of lemurs, fifteen in total, in an outdoor pen at Duke University's Lemur Center. They placed a hidden speaker between two wooden dowels—one unscented and one marked with the scent of a familiar female (since both sexes respond strongly to female scents). Next, the researchers separated a lemur from its group into this pen and played a female's call, coming from either the same female as the scent (matched) or from another female in the same group (mismatched). Lemurs also underwent trials with scents but no calls. For ten minutes, the team recorded each lemur's reaction, including whether they marked the dowels with their own scents and how long they looked toward the speaker and sniffed the dowels.

The lemurs paid more attention when a female's scent coincided with her own call rather than with another female's voice. Females showed more interest in the scents in matched trials, while males attended to both scents and calls, indicating ring-tailed lemurs can recognize individuals based on the combination of these cues—which, in the thick forest canopy, would be a useful skill. Intriguingly, the researchers suspect that lemurs integrate these multisensory inputs into cognitive representations—mental images—of familiar individuals and kin. (*Proceedings of the Royal Society B*)

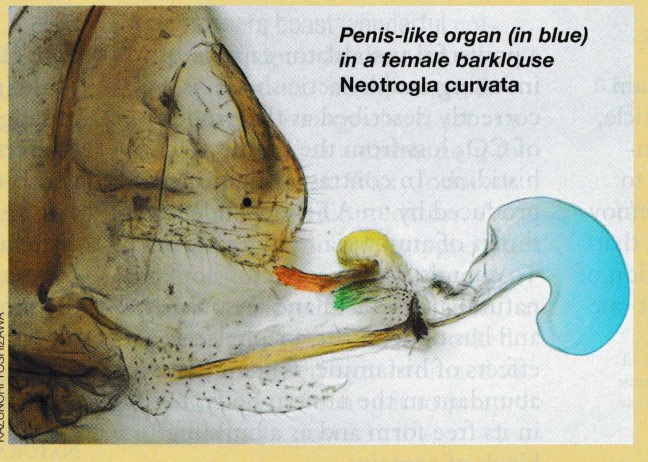
—Ashley Braun

Spiky Business

Four related species of cave-dwelling insects from Brazil have taken sex-role reversal into new evolutionary territory. To access sperm and nutrients, females of the flea-size winged insects insert a long, elaborate penis-like structure into the simple vagina-like pouch of the male. In no other known animal are the genitalia reversed.

The singular case of the cave insects was uncovered by entomologists Kazunori Yoshizawa of Hokkaido University in Japan and a team of international colleagues. Charles Lienhard of the Natural History Museum of the City of Geneva, Switzerland, described the species as members of a new genus, *Neotrogla,* and discovered the remarkable female organ. Rodrigo L. Ferreira of the Federal University of Lavras in Brazil collected specimens, including live *Neotrogla,* which were observed and examined in Yoshizawa's lab in Japan.

The erectile female organ has a membranous base, from which extends a rigid rod that ends in a tip. Within the tip is an elongated duct that carries sperm from the male to a storage chamber in the female. Once the female's "penis" is inserted, its membranes expand and push spines into corresponding pouches in the "vaginal" chamber of the male. Arranged uniquely in each species, those lock-and-key spines and pouches hold males in place for a marathon bout of copulation lasting from forty to seventy hours. The attachment is so strong, the scientists found, that trying to pull the two apart will dismember the male rather than separate him from the female.



***Penis-like organ (in blue) in a female barklouse* Neotrogla curvata**

KAZUNORI YOSHIZAWA

Yoshizawa notes that "the female penis with an anchoring function is an ultimate device for controlling copulation actively." The impetus behind the females' aggressive mating behavior likely is the voluminous spermatophore, or seminal gift, produced by males. Females may need these capsules, packed not only with sperm but also with nutritious substances, to develop their eggs in the bare, dry caves, where the insects mainly consume bat detritus. Such a scanty diet may make the plenteous spermatophores a prize that drives competition with other females and coercion of males during mating.

A "completely novel structure," according to Yoshizawa, the female *Neotrogla* penis offers evolutionary biologists a startling example of the workings of sexual selection and a new realm of possibilities to investigate. (*Current Biology*)

—Judy Rice